

**GREAT LAKES AND ATLANTIC CANAL
AND POWER COMPANY, LIMITED.**

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GREAT LAKES TO OCEAN ROUTE

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**GREAT LAKES AND ATLANTIC CANAL
AND POWER COMPANY, LIMITED.**



PROPOSED

**GREAT LAKES TO OCEAN
\$500,000,000.
WATERWAY IMPROVEMENT
AND
\$200,000,000.
HYDRAULIC DEVELOPMENT**



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SECOND BOOKLET

THIS booklet is a continuation of the first edition entitled "Historical Sketch of the Proposed Great Lakes to Ocean Route", copyright Canada, 1919 (copies of which may be obtained upon application at the office of the Great Lakes and Atlantic Canal and Power Company, Limited, Montreal), outlining the most feasible and practical water route available to create, operate and maintain, a speedy navigable waterway, with a clear depth of not less than thirty-five feet, and a width of not less than four hundred feet at low water line, connecting Lakes Champlain, Ontario, Erie, Huron, Michigan and Superior, with the Atlantic Ocean via the St. Lawrence and Hudson Rivers as follows:—

Proposed Route—The Sea to Lake Ontario

First.—By improving the ship channel of the St. Lawrence River to a depth of thirty-five feet up to the point where the Richelieu River flows into the St. Lawrence. (18.23 feet above sea level).

Second.—By building three locks to raise the waters of the Richelieu River to the level of Lake Champlain, (from 18.23 feet above sea level to 96.05 feet above sea level), at a point forty-five miles inland from the St. Lawrence River, said locks to be situated as follows:

First lock, four miles inland from the St. Lawrence River on the Richelieu River near Sorel, P. Q.

Second lock, forty-one miles further inland following the Richelieu River near Locks Nos. 5, 6, 7, 8 and 9 of the Chambly Canal.

Third lock, one mile still further inland following the Richelieu River near Locks 2, 3 and 4 of the Chambly Canal.

Third.—Beginning at a point on the Richelieu River below St. Johns, there will be a Canal with two locks; one lock at or near St. Johns and one at or near St. Etienne, connecting with the St. Lawrence River above Valleyfield (about 154 feet above sea level).

Fourth.—Between that point, above Valleyfield (where the canal will connect the St. Lawrence with the Richelieu River) and Prescott, Lake Ontario (244 feet above sea level), there will be but two locks, as most of this section will be through the St. Lawrence River except where it will be advisable to straighten the channel or avoid the excessive cost of working in River Rapids. At such places the Canal will skirt the St. Lawrence River from which it will be separated by a massive sea wall, similar to that of the Manchester Ship Canal in England, which skirts the Mersey for the first 15 miles from Eastham to Runcorn.

Alternative Routes

From the deep ship channel in the St. Lawrence River below Montreal the waterway may be improved, as per the surveys of the Dominion Government for the Georgian Bay ship canal route, by way of Rivière des Prairies to the Ottawa River, up the Ottawa River to Azatika Bay where the water level is 132 feet above sea. From this point there are three economical feasible routes to Lake Ontario.

(a) A straight cut could be made to a point above the Cornwall Canal on the St. Lawrence River (202 feet above sea). From this point the waters of the St. Lawrence could be dammed to the level of Lake Ontario (244 feet above sea).

(b) From Azatika Bay (132 feet above sea) further up the Ottawa River to where Green River enters the Ottawa (133 feet above sea) a short distance below the City of Ottawa. Thence direct across to a point a few miles below Prescott on the St. Lawrence (244 feet above sea).

(c) From Azatika Bay (132 feet above sea) a direct cut could be made to a point a few miles below Prescott on the St. Lawrence (244 feet above sea).

From Azatika Bay to the St. Lawrence any of the three alternative routes as laid out on the accompanying map can be completed with but three locks.

Lake Ontario to the Head of the Great Lakes

Fifth.—From Lake Ontario to Lake Erie, a cut will be made perfectly straight from Jordan Harbor on Lake Ontario to Moulton Bay on Lake Erie, a distance of less than nineteen nautical miles across, with but six locks, to take care of the 326 feet fall between the two Lakes.

Sixth.—From Lake Erie to Lake Huron, a straight cut will be made across the narrowest neck between the two Lakes, which are less than forty-three nautical miles apart, with only one lock, there being less than nine feet difference in the water level of the two lakes.

Seventh.—The Straits of Mackinac and the Sault Ste. Marie ship channel will also be deepened and straightened, making ocean terminals of Chicago, Ill., Indiana Harbor, Ind., Gary, Ind., Milwaukee, Wis., Duluth, Minn., Fort William, Ont., as the former sections of this improved waterway will have made seaports of Detroit, Mich., Windsor, Ont., Port Stanley, Ont., Toledo, Ohio, Ashtabula, Ohio, Conneaut, Ohio, Erie, Pa., Buffalo, N. Y., Port Maitland, Ont., Hamilton, Ont., Toronto Ont., Prescott, Ont., Charlotte, N. Y., Valleyfield, Que., and many other places on

the Great Lakes and tributary rivers, and at such inland places as Lansing, Mich., and Pittsburg, Pa., the latter place, (via the Ohio River and Ashtabula on Lake Erie) where harbors will eventually be made to dock and accommodate large ocean liners, as was done for Manchester, England.

Subsidiary Canals and Waterway Improvements

Eighth.—As a feeder to this great International waterway, the Georgian Bay Canal route via French River, Lake Nipissing, Talon Lake, the Mattawa and Ottawa Rivers to the St. Lawrence River, as surveyed by the Dominion Government for a twenty-two feet canal, could simultaneously be made to accommodate special standard type canal boats, drawing seven feet of water, as far as Ottawa, and from Ottawa, a 35 feet canal to the St. Lawrence River.

Ninth.—Another feeder could be created by completing the Trent Canal, which comprises a chain of rivers and lakes extending from Trenton at the mouth of the Trent River, on Bay of Quinte, Lake Ontario to Port Severn, Georgian Bay, a distance of some 200 miles, of which about 20 miles would be canals. The navigable portion of this system extends from Trent Bridge to Washago, a distance of 120 miles, and when completed will constitute a navigable channel from Georgian Bay to Lake Ontario via the Severn River to Lake Simcoe, Balsam Lake, Sturgeon Lake, Pigeon Lake, Clear Lake, Otonabee River, Rice Lake, River Trent, Trent Canal, Murray Canal and Bay of Quinte, Lake Ontario, and now navigable from Lake Simcoe to Healy Falls (130 miles).

The Trent Canal is Samuel de Champlain's suggested improvement of the old Canoe Route which the Indians were using when he, in 1615, travelled over the district from Georgian Bay to Lake Ontario via Lake Simcoe. This Canal project has been the subject of much public criticism and ridicule ever since it was undertaken 92 years ago. Although very little expense is necessary to complete the connecting link to accommodate standard type boats, drawing 7 feet of water, between Lake Ontario and Georgian Bay, via the Severn River, its completion has unfortunately been deferred, and the country's development greatly hindered thereby; in view of the fact that the value of this canal and water channel improvement would create the development of millions of dollars worth of hydro electric power, besides connecting the resources of that district with the best markets of the world.

Water Powers

Nature has been most lavish to Canada in the way of hydraulic resources. The government of Canada estimates the available water power of the country at 25,850,000 H. P. This includes 6,850,000 H. P. in the Province of Quebec, of which about 875,000 H. P. have already been developed, and as a result, large towns have sprung up on sites which, but a few years ago, were forests, such as:—Grand'Mère, with a population of 8,200; Shawinigan, 10,000; La Tuque, 4,000.

The La Loutre dam at the head of the St. Maurice, constitutes what is probably the largest artificial reservoir in the world; its capacity when full being one hundred and sixty billion (160,000,000,000) cubic feet. The storage permits a regular flow of over 12,000 cubic feet per second at Shawinigan. In round figures 1,000,000 permanent H. P. are now available on this river. (The St. Francis dam is expected to store about 12,000,000,000 cubic feet.)

The building of the canals and the deepening and improvement of the waterways outlined in this booklet, will create the development of over 10,000,000 Hydraulic Horse Power at such low rates as will induce the building of many new systems and sections of electric railways, placing the Provinces of Ontario and Quebec in the most ideal and economic manufacturing and transportation positions on the North American Continent.

Subject Literature

The first booklet deals with the history of the Great Lakes and Atlantic Canal and Power Company, Limited, from its inception, in the year 1896, it also contains statistics to show that the district forming the boundary of Lake Huron is actually the hub of the wealth of the North American Continent, and the heart of the greatest natural activities of the United States and Canada.

This booklet is to further demonstrate the urgency and make known facts, and valid reasons why the Great Lakes to ocean improved waterway, as proposed by the Great Lakes and Atlantic Canal and Power Company, Limited, should immediately be built, in order that the best producing areas of both the United States and Canada be not handicapped by lack of proper shipping facilities and freight competing rates to carry their products to the best markets of the world.

The proposed canal between Lake Erie and Lake Huron will of itself when used by vessels plying from ports East and West of Lake Huron, effect a reduction of over three hundred

nautical miles for every return voyage, besides avoiding the present dangerous Lake St. Clair channel route.

Lake Huron is the greatest marine connecting link in the world, even though navigation on the Great Lakes is generally open for an average of only two hundred and twenty (220) days a year, during these two hundred and twenty (220) days, statistics show that there is an average of one vessel every fourteen minutes, day and night, passing over Lake Huron to and from parts East and West, and carrying annually commodities valued at over \$1,500,000,000.

Lake Huron is not only the greatest marine connecting link in the world, but it is also the hub of the greatest centre of commercial activity in the world. The country forming the boundary of Lake Huron to a depth inland of 270 miles, produces annually more food, material and commodities, actually convertible into cash, than any other area of five times its size in the world.

The Basis of a Country's Wealth is Commerce

The German Empire aimed at an Empire of Commerce.

The British Empire today is an Empire of Commerce.

For Commerce, two things are essential; one is an abundance of resources to sell, the other is easy direct access to market.

The first exists behind the new ports of the Great Lakes, more plentifully than the world has ever known before; the second, it is hoped, is to be provided by a deep, speedy, navigable water channel from Chicago, Duluth, etc., to the Atlantic Ocean; not a barge canal, but a waterway system through which the Ocean Carriers from all parts of the world can steam from the open sea to any port of Lakes Huron, Michigan and Superior, without having to use the slow and dangerous old route passing through the Western shallow sections of Lake Erie, Pelee Pass at Pelee Island, Detroit River Channel, Limekiln Crossing, Detroit River, Lake St. Clair, Lake St. Clair Channel, River St. Clair, and carry their cargo with speed, safety and economy, from any of these important ports direct to any ocean port on the globe.

The continuous and increasing pressure for commodities from all parts of the world, upon Canada's and the United States' natural resources, creates a demand for further development, and the one main factor necessary to this development is the proposed Great Lakes to Ocean Waterway, and subsequent feeders, with its consequent hydro-electric development.

The initiative is ours to do our utmost to expedite its completion. We should not fail to appreciate the significance of having ocean vessels flying the flags of all nations of the world, carrying passengers and freight from all the ocean ports on the Globe, direct to all the principal ports of the Great Lakes.

By comparison, the cost of creating the Great Lakes to Ocean Route, as proposed by the Great Lakes and Atlantic Canal and Power Company, Limited, is less and its importance, as great, if not greater, than any of the present world famous canals. The benefits to be derived by the opening of this Great Lakes to Ocean Route would perhaps be even more pronounced than were any of the others. The tonnage lost during the war has not yet been replaced, and the impoverished theatres of operation and the warring nations have not yet been replenished. In other words, there exists a greater demand for tonnage with a much decreased available cargo space. Ship building alone cannot remedy conditions for decades to come, but more direct and more economical transportation facilities will do it; and are the better and at present the more mediate means to this end.

Service of Canals

Water transportation facilities have always been recognized as essential to the rapid development of a country, and since 1914 the Great War has proven that the nation which possessed the most and best inland shipping facilities, to ocean terminals, was the nation better prepared for war and now for peace.

Following are a few facts illustrative of the importance of canal systems used during the war.

(1) Canada had the Sault Ste. Marie Canal connecting Lake Superior with Lake Huron, and its old Welland Canal connecting Lake Erie with Lake Ontario, and the River St. Lawrence Canals, Galops, Rapids Plat, Farrans Point, Cornwall, Soulanges and Lachine, all of which total about seventy-seven miles of canals of sufficient depths, to accommodate vessels drawing up to fourteen feet of water, 255 feet in length, and forty-four feet wide, to the St. Lawrence ship channel into the Atlantic Ocean.

The United States Shipping Board used with great advantage all of these canals to transfer a great number of old and new ships from the Great Lakes to the Atlantic Ocean. in fact during the years 1914-1918, the Allies need for vessel tonnage was so great that many boats from the Great Lakes which were too long to pass through the Canadian Canals

were cut in half to be floated to shipyards in Montreal and Quebec, etc., there to be converted into ocean carriers, in fact, had it not been for the Canadian Canals from Lake Erie to Montreal, the great shipbuilding trade on the Great Lakes, which followed the declaration of war could not have prospered, and the American people could not by far have rendered as much assistance in transporting food, commodities, men and material to the Allies. It is now evident that had the canal system as proposed by the Great Lakes and Atlantic Canal and Power Company, Limited, been completed before the year 1914, the savings to Canada and United States, in the cost of cutting vessels in half, and the advantages of building new vessels at the Great Lakes Shipyards of economic ocean size, and the Hydro-Electric Power, which would have been developed and used in the manufacturing of ammunitions and war materials, would have many times paid for the cost of construction of the Great Lakes to Ocean waterway.

Inland Waterways—Facts and Figures

It is undeniable that transportation affects the price of everything bought or sold. It must be admitted that transportation limits the territory tributary to the trade of every city far more than any other one thing. It fixes the share obtained by any nation in the commerce of the world. Transportation tax is by far the heaviest one we pay.

In 1913, there were carried through the Soo Canal at the outlet of Lake Superior, 79,719,344 tons of freight. This was carried an average distance of 820 miles at an average cost of two-thirds of a mill per ton per mile. If this same quantity of freight had been sent an equal distance by rail at the average rate received by United States and Canadian railways for that year, it would have cost \$445,555,488.59 more than was actually paid for its transportation by water. Think of it, almost half a billion of dollars more would have been paid by those who received this freight, and on just one canal. Naturally that cost would have been added to the cost of the commodity when it was finally disposed of by the consignee.

Special attention is called to the extraordinary situation with respect to freight rates from Chicago to San Francisco, and vice versa, created by the opening of the Panama Canal. The distance from Chicago to San Francisco by the all-rail route is 3000 miles, by rail and water via the Panama Canal is 6299 miles (1000 miles by rail, 5299 by water). And yet even though such freight has to be handled in transit, from train to boat, at an Atlantic port, New York, Philadelphia, Baltimore, etc., it is still cheaper to transport these commo-

dities this round-about way (rail and water) than it is by the direct railway route, 3299 miles shorter. Another emphatic fact bearing testimony of the greater benefits of an all water route.

The building of the Panama Canal has shortened the route to the West coast of South America, and the Pacific, by thousands of miles, and as a matter of fact, it has given our competitors, foreign competitors especially, the advantage of this shorter route so that they can now compete with us so much more effectively by reason of the consequent lowered freight rates.

Coal has been carried from Pittsburg to New Orleans on the Ohio and Mississippi for one-third of a mill per ton mile, as against the average rate of 5 mills by the railroad, a saving of 466%.

The experience of every nation of the civilized world has been that with the improvement of inland waterways comes hand in hand the industrial expansion of those countries where these improvements are made.

It may not be generally known, but it is a fact that while Germany and France were fighting and apparently putting into this effort their every available resource, they at the same time were spending vast sums of money for the improvement of their inland waterways. France kept an army of men continually working on the Marseilles, Rhone Canal and Rove Tunnel combination waterway.

Germany, better provided with deep inland waterways kept on building bigger merchant ships than she owned before the war. She realized that whether she lost or won this war, her fight would be to maintain herself economically after the war, and she wanted to place herself in a position where her foreign commerce could be handled at a minimum cost, thus giving her the advantage over America, as well as other nations. Germany is still working to this same end.

National preparedness does not mean alone that we should have guns and ammunition and armament ready to fight at a moment's notice, but it means economic preparedness and to insure such, improved waterways must be given first place, for the military efficiency and the commercial supremacy of a nation are founded upon its industrial development, and its industrial development depends greatly on economical transportation, and the most economical of any is water transportation.

Representative Canals of the World

The great advantage of Canals and improved inland waterways was recognized in ancient times, as the undermentioned will bear testimony. There is a tradition that the Suez Canal was once dug under the regime of the Kings of Ancient Egypt, 2000 years B. C., and reopened for small boats by Necho about 600 years B. C. About this time Nebuchadnezzar of Babylon opened the Royal Canal between the Tigris and the Euphrates, but Mesopotamia had been canalized long before.

The Fossa Mariana connecting the Rhone with the Mediterranean (102 B. C.); Claudius' canal from the Tiber to the sea; the Nile canal to the Port of Alexandria; Odoacer's canal from the vicinity of Ravenna to the sea; the Roman canals in England and Lombardy; the Moorish canals in Grenada.

Cutting through the Isthmus of Corinth, the Corinth Canal was actually commenced before the Christian Era, in the reign of Nero. It is an open waterway at sea level, passing through a ridge of 287 feet in maximum height, and saves two days in the voyage between the AEgean Sea and the Adriatic.

CHINA

The Grand Canal of China begun in the seventh century, and completed according to Marco Polo, in 1289-92, connecting the waters of the Yantse and Peiho and the cities of Pekin and Hangchow, is nearly a thousand miles long, and is still in use.

ITALY

The Grand Canal of Venice, the main waterway of the City of Venice, Italy, is built winding through the heart of the city in the shape of the letter "S" and the famous Rialto, single marble arch bridge, crosses the canal. It is about 2 miles long and varies from 100 to 200 feet in width.

IRELAND

The great Irish canals are: the Grand from Dublin to Ballinasloe 164 miles long, uniting the Irish Sea to the Shannon; and the Royal Canal nearly parallel to the Grand, and built for the same purpose, from Dublin to Torinansburg, west of Longford.

DENMARK

The Danish Canal, 100 miles long from the North Sea to the Baltic opened in 1785.

RUSSIA

In 1703, Peter the Great founded St. Petersburg at the head of the Gulf of Finland, and developed a system of canals, 1,434 miles long to connect St. Petersburg with the Caspian Sea and the Cronstadt Canal connecting the Bay of Cronstadt with St. Petersburg, extending from Cronstadt on the Gulf of Finland, opened 1890.

SWEDEN

The Gotha Canal, 280 miles long, connecting Stockholm with Gothenburg across Sweden, begun 1716, completed 1832.

BELGIUM

Belgium occupies, relatively to its size, a foremost place in the way of inland navigation. Its total area is 11,373 square miles, and her navigable inland waterways total 1,250 miles. During the last thirty years Belgium has spent over \$80,000,000. on the improvement of her inland waterways, canals and ports, the result being that Belgium manufacturers can obtain their raw materials, and send their finished products to her ocean ports, at the lowest possible freight rate. Owing to the advantage of its canals and Hydro-Electric Power, Belgium has become the most densely populated country in Europe, having at her last census before the War, 589 souls for every square mile of territory.

Brussels, the capital of Belgium, is situated 50 miles south east of the German Ocean, and possesses water communication by means of the River Seine, which enters the city by two branches and connects by canals with Charleroi, Meehlin, Antwerp and the Ocean. The Scheldt and Mass Rivers rise in France and are navigable through Belgium to Holland. Their tributaries are the Lys, Dender, Durme, and Ruppel. The Mass or Meuse receives in its course the waters of the Sambre, the Ourthe and the Roer. These natural hydrographical advantages are increased by a system of 44 canals, with a total length of 563 miles. At La Louvriere, on the canal du Centre connecting Mons with Brussels, there is a fall of 293 feet in a distance of 17 miles, and 213 feet fall within 5 miles. This fall of 293 feet is overcome by five lifts, with Hydraulic rams, lifts 50½ feet to 60¾ feet, and is also used to develop enormous Hydro-Electric P.

FRANCE

France in the year 1605 began the building of canals to connect the Rivers Seine and Loire, which were opened in 1641, and between the years 1666-81 they constructed the

Languedoc Canal, 148 miles long, depth 6½ feet, raise 600 feet at Naurouse by 119 locks, and descends to Narbonne on the Gulf of Lyons, connecting the Bay of Biscay with the Mediterranean, and thus avoiding the long detour by the Strait of Gibraltar.

Paris, the capital of France, and the largest city on the continent of Europe, is located on an island in the Seine River, and by the aid of canals has navigable connection with the Rivers Loire, Saone and with the Rhine in Germany.

The Marseilles, Rhone Canal and Rove Tunnel combination is one of the most important engineering enterprises in modern times. This valuable waterway system begins from Marseilles (the leading sea port of France and the Gateway to the Orient) to Berre Lake, through the Rove Tunnel, crossing the Martinique into the Gulf De Fis, in the River Grand Rhone to Arles at the head of River Delta.

No European nation has better realized the significance of inland waterways than France. She possesses about 3,000 miles of canals, 2,000 miles of canalized rivers and 2,000 miles of open river navigation.

Kaiser Wilhelm Canal, or "North Sea Baltic", Germany

The Kaiser Wilhelm Canal, also known as "North Sea Baltic", one of the most notable artificial water channels in the world, begins at the Dock Yards at Kiel on the Baltic and enters the Elbe near Brunsbittel, fifteen miles above the North Sea in Schleswig-Holstein. Length 61½ miles; breadth at bottom 150 feet, at surface 400 feet; depth 29½ feet; locks 1,082 feet long, 147½ feet wide and have a mean depth of 45 feet over the sills. The canal is provided with eleven sidings, at which vessels may pass, great harbors at each end, and two railway bridges cross the canal 150 feet above its level. Begun in June 1887 it was opened in June 1895 with extensive improvements completed in 1914, at a cost which did not exceed \$100,000,000.

The Dortmund-Ems Canal (161½ miles) connecting the Lower Ems with the Rhenish Westphalian coal field in 1892-9; The Elbe-Trave Canal from Lubeck to the Elbe (42 miles) opened in 1900. The Konigsberg Pillan Canal (24 miles long) cut through the Kurisches Hoff in 1893-1901, and the Kaiserfahrt Channel, between the Stettmer Haff and the open Baltic in 1901.

Altogether the internal navigable waterways of the German Empire reached a total of 9,000 miles, and in the year 1910 carried the following tonnage:

Rhine River tonnage for year 1910	58,390,068 tons
Mark " " " " "	20,898,783 "
Elbe " " " " "	17,380,644 "
Oder " " " " "	8,485,005 "
Wesner-Ems " " " " "	7,962,984 "
The Eastern Waterways " " " " "	4,708,377 "
The Danube " " " " "	669,587 "
Total	<u><u>118,495,448</u></u> "

Building canals, improving waterways and developing water powers enriches a country. Take Germany for example. No European country in the last quarter of a century has experienced such rapid growth as Germany. In the twenty-five years previous to 1895, her increase in population was over 11,000,000, while France had an increase of only 2,500,000. The German Empire also has had a corresponding gain in wealth. Berlin (situated midway between the coast and the highlands) has direct water connection with Hamburg, the most important sea port on the Continent, Stettin, Breslau, Leipzig, Dresden and many other large cities along its 20,000 miles of navigable water front, a very important aid in obtaining fuel, food, etc., for the city. With such excellent connections, by water, and by rail (as all things carried by water must before or after be carried by rail), Berlin has naturally become a great manufacturing city.

Suez Canal

The Suez Sea Level Canal connecting the Mediterranean and Red Sea, was projected in 1798 by Napoleon I, and from that time on the idea of a sea level canal was kept before the Egyptian Government, until in 1846 the Stephenson's Commission was organized to further the undertaking, and in 1855 Messrs. Moguel, Linant, and de Lesseps prepared plans, which were submitted in 1856 to an International Commission. The result was, that the Suez Canal Company was granted a charter, giving them power to proceed with the actual construction work, which was immediately begun, and the canal was open for navigation November 17, 1869, at a cost of \$80,000,000.

The Suez Canal is 87 miles long, comprising 66 miles of actual canal, and 21 miles of lakes, depth 36 feet, width 213 to 262 feet, and will accommodate vessels drawing 31½ feet of water. It is operated and maintained by the Suez Canal Company, under a 100 years concession from the Egyptian Government, which concession expires November 17, 1968.

The opening of the Suez Canal affected the world's commerce by bringing the east into competition with western civilization, and reducing a voyage of six to eight months to about thirty days, and also reducing freight rates upon grains about 75%, making it necessary to readjust ancient systems of distribution, to such an extent that five years after the opening of the Suez Canal the trade of India with foreign countries had many times increased in volume.

The Suez Canal Company (a private company) has always paid large dividends to its shareholders. In 1875 the British Government through Lord Beaconsfield bought \$20,400,000.00 worth of shares in the Suez Canal Company, which stock is now worth about \$170,000,000.00. Between the years 1885-1889 the Suez Canal was enlarged and improved at a cost of \$20,000,000.00, the net revenue of the Company exceeds \$5,000,000.00 annually.

The Manchester Ship Canal, Great Britain

The Foss Dyke and Caer Dyke, in Lincolnshire, 11 and 40 miles long, constructed by the Romans and improved in the twelfth century, were the first canals in England. The opening of the Aire and Calder Navigation, towards the close of the seventeenth century, was the first important step in inland navigation. There are 3,050 miles of canals in England, 154 miles in Scotland, and 609 miles in Ireland, making 3,813 miles of canals in Great Britain and Ireland. Most of them have been acquired by railroad companies, whose policy has been to let them go out of use. Recently, however, public attention has been directed to their reinstatement as avenues for non-perishable traffic. The largest canals of Great Britain are the Manchester, Caledonian, Forth and Clyde, Crina, Gloucester, and Berkley Canal.

It may seem strange to call your attention to the fact that although England in 1882 possessed over 3,000 miles of artificial inland waterways, her Parliament allowed obstacles to be placed in the way of Mr. Daniel Adamson, the promoter of England's greatest and most valuable inland waterway asset, the Manchester Ship Canal. In 1882 Mr. Daniel Adamson called a meeting of prominent citizens of Manchester, at his home, for the purpose of discussing the practicability of building the Manchester Ship Canal, at which meeting he succeeded in interesting several parties willing to assist him in the promotion, and to apply to Parliament for authority to proceed with the undertaking. In 1883 they applied to Parliament for a bill but Parliament was blind as to the benefit to be derived from this canal and after a long and costly contest of opinion

the bill was lost. In 1884 the promoters made another similar appeal to Parliament and again met with another rejection. The two contests had then cost the promoters upwards of \$500,000.00.

The promoters made a third appeal and in 1885 Parliament granted them a charter authorizing the construction of the Manchester Ship Canal. Manchester in Lancashire, England, the terminal of the Manchester Ship Canal, is situated 183 miles northwest of London and 32 miles northeast of Liverpool. Manchester is the leading city in the world in the Textile industry, and also the third greatest port in the British Isles in the value of its sea-borne imports and exports. The Manchester Ship Canal is $31\frac{1}{2}$ miles long, 172 feet wide at surface, 120 feet at bottom, and 28 feet deep, was begun in 1887 and opened for traffic on January 1st, 1894, and for the half year ending June 1905, the available profit amounted to \$514,850.00. In July 1905 the King opened the new lock (No. 9) at Manchester, the area of which is 15 acres.

The Manchester Ship Canal starts from Eastham, on the left bank of the Mersey estuary, about four miles above Birkenhead. At the entrance there are three parallel locks of different sizes, and when the water of the Mersey is at the same level as the water in the Canal, the lock gates stand open. For the first fifteen miles from Eastham to Runcorn, the Canal skirts the Mersey, from which it is separated by a massive sea wall. At Runcorn it leaves the estuary and strikes up the Valley of the Irwell. The next locks are at Latchford, eight miles further up; and between that and Manchester are three sets of locks, the total rise about 72 feet above sea level.

The hydraulic engineering difficulty was great to overcome, since Railway lines had to be diverted and their level changed; rivers had to be carried under the Canal by means of inverted siphons, and the Bridgewater Canal carried over the Ship Canal by means of a large swing aqueduct, yet the cost of construction was only \$87,000,000. There is extensive dock accommodation at Manchester, Salford, Warrington and elsewhere along the Canal route.

London, one of the largest cities in the world, is situated as far inland on the Thames River as high tide will naturally permit vessels to navigate, in this case 50 miles from the sea, and thereby has direct water communication with foreign countries, which transportation facilities have made of it one of the greatest manufacturing cities and shipping ports in the world.

Statistics are Cold Logic

Statistics are cold logic but they are necessary for the exact realization of the resources making up the regions contiguous to the Great Lakes; the statistics may be prefaced by a few enlightening statements.

Directly adjacent to the St. Lawrence River and the Great Lakes in Canada are the Provinces of Quebec and Ontario, which would derive particular mediate benefit as also would Manitoba and Saskatchewan, for the purpose of foreign Commerce. In the United States, the State of Minnesota, Wisconsin, Illinois, Indiana, Michigan, Ohio, Pennsylvania and New York form the boundary of the Great Lakes, and for the purpose of foreign commerce, North Dakota, South Dakota, Iowa, and possibly Nebraska, Kansas, Missouri, Vermont and Massachusetts would also be benefitted. These states south and west of the Great Lakes contain more than half the farm property value of the United States; they contain one quarter of the total area of the country's population; in agriculture they are as important as the rest of the country combined. These States furnish from 60% to 75% of the products of the country in wheat, corn, oats, rye and barley; they furnish 50% of the butter, cheese, potatoes, hay and similar products. Michigan itself is the heart of the manufacturing area of the country, where is produced one-third of all the country's manufactured products. Michigan produces 75% of the motor vehicles of the country, and supplies every land on the Globe with its products.

These States produce practically everything in raw material or in finished product that man requires for normal existence. If all other markets were closed, the world could buy from this inland empire every rational want.

Restricted as lake commerce has been by the necessity of reloading for ocean shipment, the story of commerce on the Lakes is almost incredible. Twenty years ago vessels using Sault Ste. Marie Canal were limited to 3,000 tons. In 1904 the Soo tonnage was 31,546,106 and in 1914 it exceeded 100,000,000 freight tons. Compare this with a little over 20,000,000 tons in 1913 through the Suez Canal, with the 7,500,000 tons in the same year through the Kiel Canal, with 5,300,000 tons in the same year through the Manchester Ship Canal, and get some idea of the tremendous importance of the commerce of the Great Lakes.

The revenue derived from the 1917 crop from all the above mentioned States, totalled up as follows:

Illinois	\$769,206,000.00
Iowa	697,900,000.00
Ohio	464,800,000.00
Missouri	458,119,000.00
Nebraska	448,700,000.00
Indiana	441,300,000.00
Minnesota	357,200,000.00
Kansas	340,043,000.00
South Dakota	277,130,000.00
Wisconsin	264,400,000.00
Michigan	240,000,000.00
North Dakota	150,000,000.00
Part of New York State	
" " Vermont	
" " Massachusetts	
Estimated supply of traffic	500,000,000.00

Total of crop	\$5,408,798,000.00
In dairy products	39,000,000.00
Eggs	20,000,000.00

In addition to this enormous yearly crop, there are contained between these States:—

- Over 30,000,000 head of cattle,
- " 15,000,000 sheep (supplying about 70,000,000 lbs. of wool annually).
- 40,000,000 hogs, besides many millions of horses.

In 1918 Chicago received at her stock yards more than 17,500,000 heads of live stock and shipped out over 3,000,000 heads.

But rich as the surface of the inland empire is, this is surpassed by the mineral and other natural resources which in raw material and finished product are of fabulous value. There are extensive clay works in each of the States of Michigan, Ohio, Indiana, Illinois, Iowa, Minnesota, North Dakota, South Dakota and Kansas, from which is derived a revenue of several million dollars per annum.

Seven of the States are coal producing: Michigan, Ohio, Indiana, Iowa, North Dakota (in slight degree), Kansas and Missouri. Missouri is the leading state in the country for zinc and lead products. Illinois, Wisconsin and Kansas also produce zinc; Illinois and South Dakota produce lead.

Wisconsin and Minnesota granite is famous. Useful stone products such as sandstone and limestone are found extensively in Ohio, Iowa, Kansas, South Dakota and Nebraska. Missouri produces fine grindstones. Michigan, Wisconsin, Minnesota and Missouri supply both iron ore and pig iron; Michigan, South Dakota and Missouri have copper. Steel is produced in increasing quantity in Illinois, Indiana, and soon will be in Michigan.

There is petroleum or oil production in several of the States including Ohio, Indiana, Illinois and Kansas. Kansas and Michigan, among others, produce much salt; Ohio and Michigan a fine beet sugar; Iowa gypsum and ochre; Kansas, gypsum; many of the States, natural gas and mineral waters.

Chicago, Illinois,	has over 18,000 manufacturing establishments
Detroit, Michigan	" " 14,000 " "
Wisconsin	" " 10,000 " "
Indiana	" " 8,000 " "

and so on down the list.

Where else is there such a granary, industries and variety of commodities so easily available to ocean ships, when cargoes can be secured at Duluth, Milwaukee, Chicago, Detroit and at all other Ports along the route of the system of canals and improved waterways as proposed by the Great Lakes and Atlantic Canal and Power Company, Limited, and unload at Havre, Liverpool, Hong Kong, Cape Town, the West Indies or South America?

Then there remains vast regions of uncut timber. Minnesota, Wisconsin and Michigan comprise one of the four great lumber producing districts in the United States.

Figures vary, but the Federal Forest Service says: that of the present standing merchantable timber in the country of 2,000,000,000,000 feet the Northern States have 500,000,000,000 feet. The annual cut in the country was 40,000,000,000 feet. Of the splendid white pine forests, there still remains from Maine to Minnesota some 45,000,000,000 feet. Conifers are often sold as white pine, and other woods of the Northern forests are hemlock, spruce, tamarac, balsam and jack pine.

No useful timber in the Lake States is too difficult of access to be marketable. Many of the States are establishing and protecting forest reserves. Michigan has 589,000 acres so guarded. Wisconsin has 400,000 acres, and Minnesota, besides 43,000 acres of state forests, has 1,000,000 acres set aside for school lands, which is practically a forest reserve. So much for the resources of this new inland empire on the American side of the Great Lakes.

Province of Ontario

The Province of Ontario comprises 407,262 square miles, of which less than 15,000,000 acres were under cultivation before the war. Its population of over 2,500,000 holds property assessed at over \$2,000,000,000. and its annual production is in excess of \$1,000,000,000. in value.

There are over 6,500 important manufacturing establishments in the Province.

Production of pulpwood in 1918 was 787,357 cords.

Ontario has a forest reserve area of 11,539,200 acres, and it is estimated that the stand of white pine alone in the Province of Ontario would reach 40,000,000,000 feet. The productive forest area in Ontario would probably come between 70,000,000 and 90,000,000 acres. Lumber cut in Ontario in 1915 was over 1,000,000,000 feet board measure.

The only large section of Ontario which does not enjoy a direct water borne coal rate, or has not its through haul on coal reduced, because of a competitive lake and rail coal rate, is the section of Northern Ontario and Lake Simcoe, which would be particularly benefitted by the French and Severn River waterway and consequent hydro-electric power development.

It seems ridiculous, in order to reach certain heights of land localities, to have to draw coal over distances of from 900 to 1000 miles as in the case of the Abitibi Paper Mills and of the Canadian National divisional points east of Cochrane, when the available water routes in the district could be so easily made use of to carry the coal to North Bay and the local water powers developed to take the coal to the heights of land or wherever required.

In 1918 commercial coal rate from Suspension Bridge to North Bay was 2.40 cents per ton. Coal from No. 8 Ohio Field, or Pennsylvania, costs 35 cents per ton less to Erie ports for lake shipment, than all rail to Buffalo for furtherence. The boat rate from Erie Ports to Key Harbor at the mouth of the French River, averages 40 cents per ton. 7½cents extra was allowed for boat trip into North Bay. The T. & N. O. Railway coal was delivered by G. T. R. at 15 cents per ton less than commercial rating.

Bituminous:

T. & N. O. R. rate — \$2.25 less 47½ plus 35c equals \$2.12½. 126,330 tons at \$2.12½ . . .	\$268,451.15
C. P. Ry. rate — ¾ of \$1.90 plus 40c less 47½c equals \$1.19. 131,092 tons at \$1.19 . . .	155,999.48

C. N. O. R. rate (same as C. P. R.) 35,000 tons at \$1.15	41,650.00
C. G. R. rate (same as C. P. R.) 46,800 tons at \$1.19	55,692.00
Kippewa Fibre Co., rate — \$2.40 less 47½c equals \$1.92½, plus 35c equals \$2.27½, 60,000 tons at \$2.27½	136,500.00
Mattagami Pulp & Paper Co., 40,000 tons at \$2.27½	91,000.00
Spanish River Pulp & Paper Co., rate — \$2.40 plus 20c minus 47½c plus 35c, 20,000 tons at \$2.47½	49,500.00
Various points along T. & N. O., 132,218 tons at \$2.27½	300,795.93
	\$1,099,588.56
Anthracite:	
North Bay rate — \$2.40 minus 47½c plus 35c, 25,000 tons at \$2.27½	56,875.00
Mattawa, 15,000 tons at \$2.27½	34,125.00
Sturgeon Falls, 6,000 tons at \$2.47½	14,850.00
Various points along T. & N. O., 40,000 tons at \$2.27½	91,000.00
	\$196,850.00
Grand total (saving)	\$1,296,438.56

The annual saving on water borne, versus rail haul coal, will be greater in 1919. In 1918 plants closed down or reduced on account of coal famine. This year plants like the Abitibi Paper mills doubled their coal consumption. These savings would be over \$2,000,000. per year by the time the waterway would be completed.

The Canadian Pacific Railway in 1884 reached the vicinity of what is now Copper Cliff, and uncovered a body of ore which proved to be the nucleus of the richest nickel ore in the world — Sudbury district. Some forty years later the Temiskaming and Northern Ontario railway made its way northward from North Bay to Cobalt, Porcupine, Cochrane and Kirkland Lake District. Today the richness of these areas in minerals is unsurpassed.

Up to twelve years ago not a single commercial shipment of ore had been made from that section of Ontario north of North Bay. Since then two hundred and twenty million dollars (\$220,000,000.) in gold and silver have been added to the actual wealth of Canada, and ninety million dollars (\$90,000,000.) have been paid to the owners in dividends.

It is doubtful whether this record has been surpassed anywhere in the world. The nickel area has given a total of two hundred and fifty million dollars (\$250,000,000.) since its discovery. Here there are three small areas all within a radius of a hundred and fifty miles, which have given Canada almost half a billion dollars within fifteen years; yet the surface of this great mineralized area has scarcely been scratched. Untold values in these same minerals still lie uncovered in the thousands of square miles lying all quite accessible along the line of Canada's three transcontinental systems of railway. New discoveries are constantly being made, but what is still more striking, actual findings prove that this section of Ontario is rich in some of the rarest metals known to science, such as platinum, palladium, tungsten, molybdenum and barytes.

Ontario now produces 50 per cent of the total mineral wealth of Canada in the confines of the territory to be served by what would be the French River waterway improvement.

Expert engineers and geologists agree that the wealth of the Sudbury nickel area, is practically inexhaustible.

That nickel production has been steadily increasing is evident from the following table:

	Production in Pounds	Value
1915	68,168,920	\$17,042,230.
1916	82,600,000	20,685,561.
1917	127,684,150	31,921,038.
1918	129,798,660	32,449,665.

The total tonnage produced has been almost doubled in the past four years.

The following statement of one of the typical mines of the Cobalt camp which covers but forty acres, will indicate what the area has done in the way of returns.

Coniagas mine has produced 26,000,000 ozs. of silver up to October 37, 1918. It has paid out a total of \$9,240,000. in dividends.

In eight years, Hollinger alone has given almost \$26,000,000. to the world, and paid \$9,178,000. in dividends, and the Porcupine field gave \$40,000,000.

Ontario has reached an enviable position, as the following figures show. This area to be benefitted by the French River waterway, and power development at the locks, is now producing:

Ninety-one per cent of the silver of Canada.

Fifty-eight per cent of the gold of Canada.

Ninety per cent of the nickel of the world.

Is not such a territory deserving a better consideration?

Water-borne coal means cheaper mining, concentrating, cyaniding, and also smelting, for there are some classes of sulphide ore, which must be smelted, such as copper, iron and lead ores of the north, bearing good values in gold and silver, which must lie dormant till met by water-borne coking coal on the shores of Lake Nipissing.

If rapidity in national growth depends on the precious metals, the permanent and ultimate ascendancy of a modern nation is founded upon the basic industries of iron and steel. The earlier a nation recognizes this the surer and speedier its progress. Our almost limitless bodies of magnetic ore, stretching across northern Ontario, less than 100 miles north of North Bay, are destined, therefore, to play a prominent part in the industrial future of central Canada. American capital, anticipating the ultimate depletion of the hematite of Mesabba range, is now developing this range. Nothing would contribute more readily to induce activity than the granting by the federal government of a 50c per ton bonus. The experimental stage in the treatment of such ores has passed; what is now required is government inducement.

It may not be well known that in 1913 notwithstanding the tremendous output of wheat from the great west via the Great Lakes, less than 6 per cent of the total tonnage passing through the Sault Canal was wheat; 94 per cent was iron ore and coal. After the French River waterway will have been improved so as to accommodate coal carrying vessels to dock as far as North Bay, such vessels could return with iron ore cargoes to the smelters, and steel plants of Midland, Hamilton, Welland, Toronto and other places where these basic industries would encourage home production of Canadian ores.

The great clay belt in the Temiskaming District produces a grade of wheat equal to No. 1 hard. The land is rich, friable clay, which does not bake in summer.

Old Ontario, besides being adequately provided with railway facilities, is girdled by a waterway system unrivalled throughout the world.

Province of Quebec

The Province of Quebec is the largest of the nine Provinces of Canada. It comprises an area of 703,653 square miles, of which 15,569 are lakes. Lake Mistassini in the northwest of the Province is 9,500 square miles, and Lake St. John, 250 square miles. The territory known as the Province of Quebec

is three times larger than Spain, France and Germany combined, 24,000,000 acres being divided into farm lots.

Its population as per census 1916 was 1,152,244 urban
1,557,183 rural

Total 2,309,427

grouped in 15 cities, 80 towns, 208 villages, and 831 rural municipalities.

The Province crop for 1917 was valued at . .	\$153,197,900.
Dairy products	28,313,658.
Exports in 1917	551,111,934.
Imports in 1917	270,024,440.

Value of fish caught and marketed, year 1917, from Sea fisheries in the Gulf division of the St. Lawrence, comprising the Counties of Gaspe, Bonaventure and Saguenay was	2,703,187.
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The Honey crop for 1917	443,079.
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Value of forest industry for 1917, up to 31st March, 1918	71,755,325.
at which date there were 31 pulp and paper mills in the Province, with \$81,197,084. in- vestment, employing 10,342 men, and mate- rial valued at \$15,381,168. and the output amounted to	44,796,366.

The value of the Mineral products of the Pro- vince for 1917 was	16,266,480.
consisting of Asbestos and Asbestic, Iron Ore, Gold, Silver, Copper, Ochre, Mica, Phosphate, Graphite, Slate, Fire-Clay, Limestone, Granite, Marble, Magnesite, Molbdenite, Sand and Mineral Waters.	

There are 4441.92 miles of Railways in the Province of Quebec, 4,212.20 miles of which are operated by steam, and 229.72 miles by electric power.

There are over 6,500 manufacturing establishments in the Province of Quebec.

Live stock in the Province for the year 1917 consisted in Horses 379,276, Milch Cows 911 023, other cattle 858,010, Sheep 849,148, Hogs 712,087.

Canada

Mixed farming in Canada, and particularly in the district of this improved waterway and Hydro-Electric Power development, will continue to grow and develop proportionately to the advantages afforded the farmers by such inducement, and it will not be long before proper warehouses for all kinds of commodities, and storage plants, will be provided for all perishable farm products and fish.

Canada has shipped during the past two years approximately 18,000,000 pounds of fresh frozen fish to England, and a large quantity of this fish has also been sent to France and the product has already demonstrated that it is destined to become a permanent article of diet with the consuming public in England and France. Cold storage to preserve fish would be in the interests of our Atlantic, Pacific and Great Lakes fisheries. During the war, very much larger quantities of fish would have been sent overseas, had there been sufficient cold storage space available at ocean terminals.

Compare this frozen fish business from Canada with the frozen rabbit industry from Australia. Several years ago, a small consignment of frozen rabbits was shipped from Australia to England, and the business has grown to such an extent that today they are sent over by the vessel-load and constitute a standard high-grade article of food in the United Kingdom.

After the Great Lakes and Atlantic Canal and Power Company, Limited, system of canals and improved waterways will have been completed, the products of the Old World, as well as those of the West Indies and South America via New York and Lake Champlain, will be brought in exchange for our products, directly to the various markets of Canada and the United States, without transshipment. This improved and newly created channel of commerce will establish a unique centre of commercial activity on the Globe.

The Great War has shown the North American Continent that inland waterways are one of the greatest assets a country may have, not only in times of peace but in times of war. It is, therefore, incumbent upon us to take advantage of this lesson to develop our own waterways and particularly that which would further the most our growth, economically and commercially.

Every sound-minded citizen of this new world should feel some responsibility of leadership. Each individual must stand his own patriotism, and each nation must do its utmost to develop patriotism among its citizens, and true

individual patriotism should be measured by one's sincere efforts contributing to the development, growth and furtherance of his country's interest. We are all in duty bound to subdue by all possible means such evil thought as that which provoked the propaganda called "Bolshevism", leading to "Pessimism" and gradually to disaster.

The object in view is to enlighten the reader of the advantages to be derived by perfecting the natural world renowned waterway and waterpowers with which our continent has been endowed. This would prove beneficial not only to the nation but to the whole world; it would greatly reduce freight rates to and from all parts of the world, by saving double handling of freight, which adds largely to the cost of transportation, increases losses incurred by the damage of goods as well as insurance rates. In time of congested business, goods are often considerably delayed in transit and shippers or consignees suffer serious losses. By rendering possible the through shipment of freight without transfer, it will permit the movement of a heavy tonnage of lumber, ore, coal and other commodities which can seldom bear the expense of a double handling, en route.

A project of such national and international necessity and importance should not admit of parochial interference nor of any hindrance by localized selfish ambition and interests.

Failure of the Government to encourage this project would probably impair for years the impulse of Canadian social and economic progress, add to the crime of profiteering, and make the future generation pay needlessly for the apathy of today.

A certain obligation rests upon Canadians. As a result of the development of the numerous natural advantages of the country, they have succeeded in possessing the world's greatest Railway Organization (Canadian Pacific Railway Company); they have prospered and become wealthy, owing to the enormous amount of business created by the wonderful expansion of trade since the inception of this Railway Organization, which has proven its unlimited value to the entire country, and largely rewarded the promoters and shareholders.

Experience has proven that hauling by electricity is in many ways preferable to hauling by steam.

The most recent experience available in America, on an extended scale, for both passenger and freight, has been over the 440 mile stretch on the Chicago, Milwaukee and St. Paul Railroad, between Harlowtown, Mont., and Avery, Idaho. This is a mountainous stretch, including the heavy grades of the Continental Divide.

In the early tests, fifteen electrical locomotives of an especially powerful type did one-third more work than the seventy-five steam locomotives which they replaced.

It is estimated that the annual saving in coal on this run, measured in horse-power, is equal to the continuous toiling of 1,450,000 men.

Adoption of electrical power to all our railroads between Georgian Bay and the St. Lawrence (via both Lake Simcoe and Lake Nipissing over the Height of Land) would release millions of tons of coal a year for other industrial purposes, and at once add a tenth to the carrying capacity of our railroads, since one ton in every ten now hauled is made up of fuel and fuel containers for the use of the railways.

Saving so much coal would, for two reasons, relieve all fears of an imminent fuel famine. It would add a sixth to the supply available for general use, and greatly increase the ability of our railroads to move coal steadily during the winter, since electrical power is not crippled by cold weather, as steam power is.

As a matter of fact, the ultimate gain in using electrical power would be very much more than this, for, besides saving coal it would almost double the efficiency of the railroads, as evidenced by the Chicago, Milwaukee and St. Paul Railroad; greatly increase its earning powers, furnish means of reducing both freight and passenger rates, and of paying higher wages and proportional dividends.

The change from steam-power to water-power is not only significant of lowered costs in manufacturing, and the saving of the earth's stored fuel for other more important uses, but it relieves the labor necessary in mining the coal and the still greater burden of transporting it. The Miner's output is something less than one thousand tons a year, so that for every one thousand tons diminution of the fuel requirement the equivalent of one man is set free for other activities. Every waterpower harnessed and displacing steam-power implies, therefore, a great band of laborers in the mine and on the railroads freed from this particular necessity of toil for other and more useful labor.

Apace with the Century

"The reason a greater number of men do not accomplish more is because they do not attempt more". Mere labor is limited, but intelligent combination is unlimited, and is only a tax on man's brain and progressiveness.

The Chinese coolie carries 100 pounds, twenty miles in a day; a ton mile a day for 10 cents, and when the roads get bad, instead of fixing them, the coolies and peasants strengthen their carts.—

James J. Hill conceived the idea of a transcontinental unsubsidized railroad from the head of the Great Lakes to a Pacific harbor. The lands were there but not yet tilled, mines were there not yet opened, lumber was there as yet uncut. China and Japan were in quest of American wheat, so Mr. Hill borrowed the savings of the economical Hollanders he was to employ, which he used in creating a great transcontinental road. Instead of earning 10 cents a day like the Chinaman, these employees of his, in shorter hours, and in far easier occupation, earned thirty times as much. The cost of transportation was reduced from the Chinese standard of 10 cents a ton mile, to the American standard of 1 cent a ton mile; the distance per day was increased from twenty miles to one hundred. Mr. Hill's foresight and intelligent use of the means at hand resulted in a decrease of 90 per cent. in cost and an increase of 400 per cent. in efficiency, over the coolie system of transportation, and it opened up new markets that have added at least a billion dollars (national asset) to the wealth of the United States, and of this he was able to keep five per cent. for himself. The coolie is used to exemplify the type of the unthinking, unprogressive laborer — the visionless; J. J. Hill is used to illustrate the progressive upbuilder, the organizer and pioneer.

The history of the world's progress is a constant series of efforts against apparently unsurmountable obstacles in the thing itself or in conflict with unenlightened public opinion, the grappling with tasks always larger and seemingly more difficult than past achievements.

The universe would stand still in ignorance and savagery if this upward struggle were not bravely and persistently maintained.

The modern world of invention is a perfect fairyland of achievement, exceeding the most fanciful dreams of even a generation ago, and each invention is the triumph of some earnest worker over a task, which, at one time, seemed beyond man's conception.

It was too arduous a task to cross the continent on foot, so men summoned steam. As population increased and

spread over vast areas, and business demanded quicker and better means of intercommunication. Morse grappled with the mighty problem and gave the world the telegraph, Bell the telephone, and Marconi wireless telegraphy. And soon wireless-telephony will be general. So much for scientific progress—materially this work is a better world than it ever was before — it forges ahead harmoniously—every scientific achievement is productive of consequent physical betterment, of larger fields of action, of greater emulation for more rapid and healthy growth—so we have the aircraft.

The aircraft with greater and speedier means of world civilizing efficiency, greater and improved waterways and canals,—healthier transportation arteries,—the greater use of hydro-electric energy and the improved facilities for greater production, etc., speedier Water Channels to connect Great Lakes to Ocean, and the greater development of Water Power.

Bigger Canada

It is to the general public's particular benefit and advantage, as well as to all progressive commercial men, to encourage by all possible means, the betterment of transportation facilities, air, rail or water, that would induce capitalists to assist the economical and rapid colonization of the hitherto inaccessible regions of the interior of Northern Canada. Starting in the East with Ungava (or New Quebec), stretching westward through Northern Ontario and across that vast expanse of land known as the Northwest Territories, there lie over two million square miles of virgin lands, abounding in natural resources of inestimable wealth, including timber, minerals, fish, and the largest quantities and finest qualities of fur-bearing animals in the world.

In this extensive area water powers abound, which when made easily accessible would be harnessed to further the country's development. Of these many waterfalls, the MacLean Falls in New Quebec, situated on the Hamilton River, has a head of over 300 feet, with estimated possible development of over 1,000,000 horse power.

The northern half of Canada is on the eve of great development as one of the food-producing Districts. One reason for this statement is the fact, that over one million square miles of grazing land, exist in Northern Canada, on which the reindeer and musk-ox can graze in the open the year round. Musk-ox meat is indistinguishable from that of beef, and reindeer meat is considered by all those who know

it to be the best on earth. Musk ox also provides wool of good quality and reindeer skins are of value.

Only two or three decades ago, farm lands in the vicinity of Edmonton, Alberta, were not deemed a good agricultural investment due to the high altitude, but today wheat and other grains ranking in quality with the finest in the world are harvested in the Peace River Valley, which is situated several hundred miles north of Edmonton.

Still fresh to memory are the stories of the Yukon, the Klondyke, Sudbury, Cobalt, Porcupine and other well-known mineral developments in northern areas, all of which were at one time, after a cursory examination, pronounced to be of no commercial value.

As great a future can surely be predicted for these vast territories as soon as they have been opened by adequate transportation facilities.

The Public Press—The Great Lakes and Atlantic Canal and Power Company, Limited. — Lake to Ocean Route Project

Following is an extract from the editorial page of one of Chicago's leading newspapers:—

"Chicago is Destined To Be the Greatest World Port"

There are many REASONS for this belief. One is the possession NOW of the GREATEST WATER FRONT in the World.

Chicago, the greatest railroad centre in the world, to become the GREATEST port in the world.

Liverpool has a water front of thirty-six miles. Chicago has a total of eighty-three and one-half miles.

Manchester has thirty-six miles. London, whence the ships of commerce have been sailing to the four corners of the earth for 300 years, has a total of twenty-seven miles of water front. Havre, with which many of our returned fighters are familiar, has but seven and one-half miles, while Hamburg has forty and Rotterdam twenty-three miles.

So it is easy to see that Chicago has the facilities for becoming the greatest port in the world, because freight that is hauled on ships must needs be hauled, before or after, on railroads. The so-called "foreshore" meaning the water to a depth of about forty feet is twenty-two miles long and has a width nearly five miles, making a total available space for

the construction of shipping facilities, approximately 100 square miles. This means probably seventy-five square miles of "slips" and twenty-five square miles of dock. Thus here will meet the railways that tie Chicago to the whole of the country, and especially the Middle West, the boats that will ply between the mouth of the river and New Orleans via the Great-Lakes-to-the-Gulf waterway, and the ships that will bear their burdens between Chicago and the world across the seas.

That Chicago's possibilities are recognized as a great ocean port is demonstrated by the fact that New York interests are already making it their business to boost an Erie Canal route out of the lakes to the Ocean, that New York will not be ignored entirely as Chicago's ships go steaming back and forth between the Middle West and the Old World. The time is not far distant when the yellowed grain of the Middle West, the products of the great corn belt, the fuel of Illinois and Indiana, and the manufactured products of the most rapidly growing industrial centre in the world, will be hoisted or poured aboard steamers that will ply directly between Chicago and Liverpool, Rotterdam, Havre and other great ports abroad. It may sound like a dream, but Chicago must not overlook the fact that it is only within a month that the "Lake Granby" a Chicago steamer, which sailed from the prosaic locality of "back o' the yards" landed its great cargo (and, incidentally, several thousand copies of this newspaper) on the docks in Liverpool, after a direct voyage that included the incomparable Soo and Welland Canal, that preceded the trip down the St. Lawrence."

The following extracts are from an editorial of the London, Ont. "Free Press":—

"The Associated Boards of Trade of Ontario have unanimously agreed to urge the building of a system of canals that will give ocean boats access to the Great Lakes. The estimated cost of these canals is \$300,000,000. To meet the interest and sinking fund charges upon this large sum of money, it is urged that transportation would be cheapened to the extent of millions of dollars annually, while the canals would develop electric power worth at least \$25,000,000. Our factories will have raw materials delivered at their doors from all parts of the world by means of cheap water transportation, their wheels will be turned by the cheapest

power known, and their finished product will be shipped out also by water, with little or no railroad haul to add to the costs.

The construction of the proposed canal should be assisted in a considerable degree by the United States, all of whose Great Lakes ports would be equally benefitted with our own. The assistance might take the form of a direct contribution, or tolls, or both."

Extract from Montreal "Star".

"Statistics of Canadian exports of foodstuffs in the twelve months ending July 31, 1919.

Canadian exports in the period mentioned include 16,202,320 pounds of butter, 145,208,450 pounds of cheese, 55,486 bushels of wheat, 181,949,455 pounds of bacon, 131,246,513 pounds of beef, 12,414,976 pounds of canned meats, and 33,572,004 pounds of pork."

Extract copied from "The Detroit News".

"A World Port of Detroit".

"This breaking bulk, or cargo, is to be eliminated by the direct waterway to the Ocean, all the interests of the States affected, uniting the common ground of the benefits for direct port to port traffic. Many reasons make it difficult to predict the size of ocean craft that ultimately will traverse the Lakes, but sizable ocean vessels flying the flags of all the governments of the world will pass through the gateway formed by the Detroit River."

The Port of Montreal, in 1918, reached a commanding position in connection with commerce between North America and Europe, owing to the safety of the ocean route, via the Gulf and River St. Lawrence Channel. The distance from Cape Race to Montreal is only 965 nautical miles, and from Belle Isle to Montreal is only 873 nautical miles.

Extract from Montreal "Star".

"The New York Evening Sun, in an editorial headed "Montreal", says:—

"It may surprise some readers to learn that for the seven months or so during which it is open the Port of Montreal handles Ocean traffic greater than that of any

American city except New York. Its tonnage is also steadily increasing and better methods of icebreaking have extended its season. It has strategic advantages similar to our own in being a railroad terminus and central distributing point for trade converging from a vast territory.

And Canada is alive to its importance. The Dominion Government co-operates liberally with local enterprise. Recently, \$28,000,000 has been spent on terminals, dredging, docks and other things necessary to security. The Department of Marine is at work deepening the St. Lawrence to thirty-five feet to the sea, and the channel should be complete in a short time.

They not only talk about things but do them and do them well. It is another example for our congressmen to ponder, as well as an incitement to our own activity."

Statistics Imports - Exports - Distances - Vessels

The following are statistics for comparison:—

Port of New York:

1917

Value of Imports	\$1,328,199,355.
" " Exports	3,053,119,504.
	\$4,381,318,859.

Port of Montreal:

Value of Imports	\$ 214,885,029.
" " Exports	534,876,677.
	\$ 749,761,706.

Philadelphia:

Value of Imports	\$ 109,485,782.
" " Exports	464,477,031.
	\$ 573,962,813.

Boston:

Value of Imports	\$ 217,905,287.
" " Exports	225,578,485.
	\$ 443,483,772.

Baltimore:

Value of Imports	.	.	.	.	.	\$	43,972,790.
" " Exports	.	.	.	.	.		374,033,121.
							\$ 418,005,911.

New Orleans:

Value of Imports	.	.	.	.	.	\$	104,516,862.
" " Exports	.	.	.	.	.		303,510,401.
							\$ 408,027,263.

Galveston:

Value of Imports	.	.	.	.	.	\$	8,505,116.
" " Exports	.	.	.	.	.		266,279,258.
							\$ 274,784,374.

Table of Distances.

From	To Liverpool Nautical Miles	To Rotterdam Nautical Miles
Montreal:		
(via Belle Isle)	2,760	3,293
(via Cabot Straits)	3,007	3,540
Quebec:		
(via Belle Isle)	2,625	3,158
(via Cabot Straits)	2,872	3,405
Halifax	2,485	2,771
St. John, N.B.	2,692	2,978
Portland, Me	2,776	3,062
Boston	2,854	3,140
New York	3,036	3,322
Philadelphia	3,172	3,438
New Orleans	4,525	4,813
San Francisco:		
(via Panama Canal)	7,843	8,107
Vancouver:		
(via Panama Canal)	8,648	8,912

674 sea-going vessels docked at the Port of Montreal during the season 1918. They were navigated by 40,094 seamen of different nationalities.

Nationality	Numbers of Vessels	Tonnage.
British	479	1,653,477
American	175	244,949
French	9	4,393
Italian	3	9,516

Norwegian	3	7,236
Portuguese	2	5,931
Belgian	1	2,838
Swedish	1	1,914
Brazilian	1	3,228
	674	1,933,482

The St. Lawrence Ship Channel

Masters, as well as many of the crews of these ships who have spent years trading to the Ports of Africa and Asia, expressed their admiration for the facility with which their large ships navigated the River St. Lawrence ship channel to Montreal by night as well as by day.

The records of the four seasons of navigation during the war, should be sufficient to convince the navigators distinctly in favor of the St. Lawrence Route. During this period of the war, when ships were valuable and cargoes urgently required, and when the St. Lawrence Liners, with their experienced crews were not available, vessels commanded by navigators who had never sailed to the St. Lawrence, entered the Gulf, and after their first voyage to Montreal, readily gave appreciative opinions as to the improvements and safeguards resulting in a navigation much less hazardous, and even less intricate than many of the world routes in Northern European waters, in the Mediterranean, or to the American Seaboard.

The work of improvement done in the widening and deepening and lighting and buoying of the ship channel between Montreal and Father Point exceeded \$1,000,000. annually for the last three years, as follows:—For the fiscal year 1914-15, \$1,105,187; 1915-16, \$1,101,820; 1916-17, \$1,122,479; and the total cost of the channel since its inception in 1851 to the end of the fiscal year 1917 has been \$21,520,371.

From Montreal to Quebec is 139 nautical miles, and from Quebec to Father Point 156, and it is doubtful if at present any other waterway in the world of equal extent is more thoroughly safeguarded.

In the Department's annual report for 1916-17, the superintending engineer of the St. Lawrence ship channel drew attention to a communication received from Messrs. Henry Fry and Company, Lloyds' agents at Quebec, emphaz-

ing the fact, that no accident has occurred to any sea-going vessel between Father Point and Quebec in the course of the year.

The 35 feet channel now being dredged by the Government between Montreal and the sea is well under way and it is expected will be available for ships in a few years. Montreal Harbour Commissioners have already provided several berths for vessels of this draft.

The channel having a width of from 450 to 750 feet well marked by range lights and lighted buoys, will provide a route safe and facile for vessels up to 20,000 tons.

The St. Lawrence route is becoming more attractive year by year. The three-day trip in calm waters, within signalling distance of the shore, is appreciated by many passengers. From the time ships enter the Gulf of St. Lawrence until they are safely berthed at their docks as far west as Duluth or Chicago, vessels may be in constant communication with the Authorities and their Agents, and every possible safeguard is provided by the interested Governments.

The present agitation by the Great Lakes and Atlantic Canal and Power Company, Limited, should meet with the full support and co-operation of all commercial and shipping interests, in its endeavors for the further improvement and deepening of the St. Lawrence River channel, and of the construction and improvement of its ocean route to the head of the Great Lakes. Subordinate interests should not be considered as against the benefits to be derived by the whole of Canada, the North American Continent and the whole world.

Extracts from the Harbour Commissioners of Montreal Report for 1917

Inland Waterways.

"The thought in some Canadian minds is, that the new Welland Canal, when completed, will throw the advantage Canada's way. This is open to doubt, for the reason that this Canal, is free of charge to United States ships, though constructed at the sole expense of the Canadian people, and the United States will be enabled to bring their large lake boats through Lake Ontario to Oswego, N.Y., and thereby still further reduce the cost of transporting grain from Buffalo to New York.

It is true that the Canadian route may benefit to some extent by the construction of the Welland Canal, which will permit large vessels to come to Prescott and Kingston, but this will require the most modern grain handling facilities at these points, as well as consideration of the efficient handling of grain from these points to Montreal, which elevators, etc. would cease to be of use when the whole St. Lawrence canal system is completed.

The ideal and proper method to pursue to get full benefit of the Welland Canal is a simultaneous development of all the canal systems to Montreal, no matter by what scheme.

The canalization of the St. Lawrence River, with its immense power possibilities is, in the opinion of the Commissioners, preferable to deepening and widening the present canal system.

Whichever method, however, is finally adopted, the completion of a scheme of such magnitude would require expense and time, but it is one that **must** be carried out and should be aggressively proceeded with. If it is not found possible to proceed with the whole scheme simultaneously, the opinion of the Harbour Commissioners is; that the portion of the inland transportation system which is most immediately required, and which will give the most immediate benefits, is the section of the canal system commencing at Montreal working Westward.

Minnesota—Gary, Indiana

An idea of some of the wealth that would flow through this direct lake to ocean route has already been given, in the statistics relative to present tonnage, and also by mention of the greater development it would bring about, particularly in Canada. The potential possibilities of these ocean terminal lake ports as feeders to this great waterway, is beyond conception. A few facts and figures given of one of the mediate states, which has particularly favored the granting of bonuses and guaranteeing of bonds to encourage inland transportation by rail and water, is the State of Minnesota (in which is Duluth, its coming terminal sea port and

the hub of a great number of Railway and Steamship Corporations) which has recorded wonderful developments since 1849, when it had a white population of only 5,000. In 1851 the Sioux Indians ceded to the United States all their lands between the Mississippi and the Big Sioux. Since 1851 the growth of Minnesota has been rapid; admitted to the Union September 21st, 1857, population then only 150,092. One of the first and most progressive Acts of this State was when in 1858 it guaranteed a first bond issue of \$2,275,000. to encourage railway construction. The first Railway in Minnesota was a ten mile road from St. Paul to St. Anthony, finished in 1862; between 1864 and 1872 a Congressional land grant of 9,992,042 acres was given. The increased mileage from 1869 to 1879 was at the rate of over 200 miles per annum.

There are five navigable rivers within the State, with a water line of 1,532 miles. The Mississippi and Red Rivers are navigable to St. Paul about 230 days in the year, and the Railway system of Minnesota is so far extended that all water routes are connected by rail, thus affording economical and direct transportation to all parts of the North West, and all available to feed the Lake to Ocean speedy navigable waterway proposed by the Great Lakes and Atlantic Canal and Power Company, Limited.

Topography of Minnesota, Minnesota is one of the new States of the United States, only partly developed, but is bound to become one of the leading producing States of the Union. It is situated nearly in the centre of the Continent of North America on the highest plateau of land lying between the Gulf of Mexico and the Hudson Bay, and forms the watershed of the great river systems of the country.

There are 700 small lakes in the State, varying from one to thirty miles in diameter, while several of them have an area of from 100 to 400 square miles. The Mississippi River rises in Lake Itasca and flows for nearly 800 miles through the State receiving the Minnesota River at Fort Snelling about five miles above St. Paul.

The Red River of the North rises in Elbow Lakes, turns Southwest, and North and empties into Lake Winnipeg, which has an outlet into Hudson's Bay.

The St. Louis River which rises in the Northwest, falls into Lake Superior and forms the first link in the chain of rivers and lakes of the St. Lawrence system.

The headwaters of the Des Moines are in the Southwest section, and the State possesses exceptional advantages in the number of miles of navigable water within its borders, and the splendid drainage facilities afforded by the great rivers and their tributaries. These rivers also furnish vast water power.

The largest ore shipping dock in the world is the new dock of the Duluth Missabe & Northern, on Duluth-Superior Harbor, which was placed in operation May 1st, of this year (1919). It has a length of 2,438 feet, sufficient to dock on either side any two of the largest ships in the world, and its coaling facilities consist of 384 pockets, each capable of receiving eight standard fifty ton ore cars, thus providing a storage capacity of 3072 cars, or 153,600 tons.

Gary, Indiana.

Gary, Indiana, will become a great sea port.

The City of Gary is situated two miles from the Southern shore of Lake Michigan, on the Baltimore and Ohio, The Lake Shore and Michigan Central, and Michigan Southern and other railroads. The greater part of Gary is owned by the United States Steel Corporation, which since the year 1906 has proceeded to establish large Steel works and other industries, and a model town for its employees. Both the United States Steel Corporation and the people of Gary will be greatly benefitted by the Great Lakes to Ocean Route.

The Panama Canal

The Isthmus of Panama was visited by Columbus in 1502, when he discovered the "RIVER OF CROCODILES", now known as the Chagres River, and coasted along from Almirante Bay near Costa Rica boundary to Porto Bello Bay, where he planted a colony (Nombre de Dios). He was seeking a passage from Europe to Asia, and financial assistance from Spain for the continuance of his exploration to the Wonder Lands portrayed by Marco Polo and other travelers in the East.

It was on the 25th September, 1513, that Vasco Nunez de Balboa, Governor of the District, organized by Spain, accompanied by a few Indians and Spaniards, having cut his way through the wilderness, had crossed the Isthmus and discovered the Pacific Ocean and named it the South Sea, and with the report of his discovery to Spain, he recommended that a Canal be immediately dug across the Isthmus. While the suggestion very much attracted the attention of Spain, the actual work was deferred. But the vision which Columbus and Balboa beheld from the lonely height in the tropical wilderness was not to fade. It continued to haunt the minds of men for four hundred years, and then it became a reality, which has proven beneficial to the whole world.

In 1519, the Old City of Panama was founded, the first permanent European settlement on the mainland of the American Continent.

The vision of a canal moved Charles V., in the early years of his reign, to order a survey of the Isthmus, but it was not made because the governor of Darien pronounced the project impossible. In 1550 the Portuguese navigator Antonio Galvao published a book to demonstrate that a canal could be cut at Tehuantepec, Nicaragua, Panama, or Darien; and the following year, F. L. de Gomara, the Spanish historian petitioned Philip II to undertake the work. But the Spanish government had grown indifferent to the canal scheme, considering that a monopoly of communication with their American possessions was of greater importance than a passage by sea to Cathay. It even discouraged the improvement of the communications by land, and decreed that to seek or make known any better route than the one from Porto Bello to Panama was an offence punishable by death.

For nearly 150 years following the decree, no serious move was made towards the construction of a canal. Still the vision persisted, and Champlain and other travellers who visited the Isthmus, wrote, illustrating the feasibility and value of such an undertaking.

In 1698, William Paterson, a brilliant Scotchman became imbued with a scheme for a canal at Darien. He tried to interest the English government but failed. (He, in 1694, was the founder of the Bank of England.) Then Paterson secured from the Scotch parliament a charter for the "Company of Scotland trading to Africa and the Indies." This company, according to Paterson's plan, was to establish a settlement on the Isthmus of Darien, dig a canal, and "thus hold the key to the commerce of the world and turn Scotland from one of the poorest to one of the richest countries." The enterprise was popular and funds were freely contributed. The plans were conceived in a broad and beneficent spirit, difference of race, and religion, were to be ignored, the new port was to be a harbor of refuge for the ships of all nations, and world-wide free trade was to be established. The settlement was planted in 1698, but in 1700 the Spanish authorities expelled those few Colonists.

In 1808 the Isthmus was examined by Alexander von Humboldt, who pointed out the lines which he considered worthy of study. After the Central American republics acquired their independence in 1823, interest in the Canal question was greatly increased. In 1825 Nicaragua, having received applications for concessions from citizens of Great Britain, and also from citizens of the United States, made overtures to the United States for aid.

In 1830 a concession was granted to a Dutch corporation under the special patronage of the King of the Netherlands to construct a canal through Nicaragua, but the revolution and the separation of Belgium from Holland followed, and the scheme fell through. Subsequently several concessions were granted to citizens of the United States, France, and Belgium, both for the Nicaragua and Panama routes.

In 1866, in response to an inquiry from Congress, Admiral Charles H. Davis, of the U. S. Navy, reported that "there does not exist in the libraries of the world the means of determining, even approximately, the most practicable route for a ship canal across the American Isthmus". To clear up the difficulty Congress in 1872 appointed an Inter-oceanic Canal Commission and provided for the send-

ing out of a series of expeditions under officers of the navy by whom all the routes were examined.

Between 1870 and 1875, two routes were set forth in the report, the shorter one over the height of the continental divide of about 300 feet above the sea, and the other, a very much longer route, about 153 feet above sea level.

While the American Inter-oceanic Canal Commission was making the investigations relative to the comparative merits of the different isthmian routes, a canal project was started in France.

The completion of the Suez Canal in 1869, and its subsequent success as a commercial enterprise, aroused the French nation to enthusiasm, through the part of Count de Lesseps in the making of the Suez Canal.

Financiers began the agitation of another enterprise in which France should play the leading role. Their plans were carefully made. In 1875 the subject was discussed by the Congrès des Sciences Géographiques at Paris, and that body recommended the making of surveys with a view to building a canal. Soon after the discussion of that Congress a provisional company of speculators was formed for the purpose of securing a concession from the Republic of Columbia. Acting as agent for this company, Lieutenant L. B. N. Wyse, an officer of the French Navy, secured from the Colombian Government in 1878 a concession for the construction of a canal from Colon to Panama. The concession gave the promoters the exclusive privilege of constructing and operating a canal through the territory of the republic, the only restrictive condition being that if the route chosen traversed any portion of the land given to the Panama Railroad Company, the promoters should make satisfactory settlement with that company before beginning the work of construction. On the part of the company it was agreed that the course of the canal should be determined by an international congress of engineers.

Possessed of this valuable concession the promoting company organized what is generally known as 'Panama Canal Company' and transferred to it what has come to be known as the Wyse Concession. Count de Lesseps became

the chief engineer of the company, a fact which guaranteed the support of all classes of Frenchmen. Invitations were issued for an International Congress to determine the route of the canal.

The Congress convened at Paris in May, 1879, and among the 164 delegates in attendance were representatives from the United States, Great Britain and Germany. This Congress decided upon the feasibility and recommended the construction of the Panama Canal.

Panama had a more or less troubled career from 1885 until November 4, 1903, when it became an independent state. A few weeks after its independence the new Republic made a treaty with the United States of America, which treaty gave that country the right to build the Panama Canal, together with a perpetual leasehold of a strip of territory ten miles wide across the Isthmus from ocean to ocean. This territory is known as the Canal Zone, and, while it divides the domain of Panama into two parts, the arrangement is such that the rights and interests of her people are fully protected.

The United States purchased the French interest for \$40,000,000.

It placed the total value at \$42,799,826. divided as follows:

Excavation useful to the Canal, 29,980,000 cubic yards	
Panama Railroad Stock	\$25,389,240.
Plant and material used and sold for scrap	9,644,320.
Buildings, used	2,112,063.
Surveys, plans, maps and records	2,054,203.
Land	2,000,000.
Clearings, roads, etc.	1,000,000.
Ship channel in Panama Bay, four years' use.	100,000.
	500,000.
Total	\$42,799,826.

The United States began the work of construction May 4, 1904.

For three years the operations were purely of an experimental character, for the efforts of the staff, warned by the

high death-rate among the employees of the former company, were largely directed to the consideration of those sanitary measures without which it was realized that success could not be attained. As a result of the health campaign thus inaugurated yellow fever has been eradicated, bubonic plague held at bay, malaria reduced from a virulent to a mild form, and an unhealthy country made into a desirable residential area.

In April, 1907, the work was placed under the control of the Engineers Corps of the U. S. Army. A new Commission was created of which Colonel George W. Goethals was made Chairman and Chief Engineer. The zone census of 1912 showed that forty nationalities were represented at that time among the workers. The whole world has had a hand in digging the Panama Canal.

October 13, 1913, witnessed the destruction of Gamboa dike, the removal of which permitted the water to enter the Cut.

The first passage of a self-propelling vessel through the Canal from ocean to ocean was made on January 1, 1914. The vessel thus honored was "La Valley", a unit of the old French floating equipment.

The Panama Canal has cost the United States about \$375,000,000.

Right down from the days of Columbus, the intelligent progressive world had desired a canal across the American Isthmus, and since the American acquisition of California and a frontage on the Pacific, the people of the United States had not ceased to consider how the Isthmus barrier might be broken through. The primary object of the United States to control the Panama Canal has been to promote their domestic trade, and to remove the handicap under which they were forced to compete with the people of Europe for the vast commerce of the Pacific.

The Panama Canal was also to greatly increase the mobility of the fleet of the American Navy, and the strong fortifications guarding the canal zone is made a naval base, from which a squadron may go forth to strike a blow, and to which it may confidently return for coal, supplies and

necessary repairs. The Canal unites the Atlantic and the Pacific Fleets.

The Panama Canal is not as much a Canal through the Isthmus, as it is a bridge of water across and over it. The so-called Canal is a huge water bridge, the first in the world's history. It is about 50 miles in length, 85 feet high, with a channel of water through its centre varying in depth from 45 to 87 feet, in width at the bottom from 300 to 1000 feet. The bridge is divided into two sections, Gatun Lake and Culebra Cut, the latter being an arm of the former. The Panama bridge of water connects the Atlantic with the Pacific with three steps of water from both oceans.

In constructing the Panama Bridge and securing a level for its channel, it was necessary to cut a passage through a mountain range near the Pacific end and to erect a lower mountain range or ridge at the Atlantic end. The first is known as the Culebra Cut, and the second, composed in large part of the earth and rock taken from the Cut and transported about thirty miles, is known as the Gatun Dam.

A mountain had to be moved, not by faith, but by dynamite, steam shovels, and railway trains, and set up anew thirty miles away.

In a large sense the work of the Isthmus was divided into two parts, — destructive and constructive, and besides the greater quantity of material which originally had to be excavated millions of tons of material also had to be removed from the channel, now the Canal, owing to the numerous "slides".

The Panama Canal means other canals, which in coming years will occupy our engineers and give employment to thousands of laborers. They will open a vast network of waterways over the land, linking the lakes and rivers of the interior. This will give to the inland sections of the country an enlarged commerce at lower rates, thus providing for a greater industrial growth than now seems possible.

Much of that which has been said as to the benefits which will come as a result of the shortened water route between the Atlantic and Pacific seaboard of the United States applies also to Canada. Vancouver of all the ports

in the British Empire is the one most likely to be favorably affected by the completion of the Panama Canal. That this is realized is shown by the preparation there being made for increased traffic. Farther north is the fine deep-water harbor of Prince Rupert, the terminus of the Grand Trunk Pacific Company's new transcontinental line, which will become of great importance in the near future. Victoria, on Vancouver Island, and New Westminster on the mainland are fully awake to the potentialities of the change in transport conditions.

The Province of British Columbia, of which these ports are the outlets, is one of great and varied resources, which up to the present time have been but slightly developed, although a growing commercial intercourse has been established with China, Japan, Australia, and New Zealand. By way of the Panama Canal, the route from Liverpool to Vancouver has been shortened 5,921 miles. Vessels according to their size and speed require from ten to twelve hours to pass through the Panama Isthmus from the Atlantic to the Pacific Ocean, and all vessels are towed through the Canal locks by electric locomotives, operating on tracks on the lock walls. For a vessel steaming 300 knots per day, this means a saving of twenty days on each voyage.

This route offers a new outlet for the grain exports of the Canadian Northwest, which, hitherto, have been mainly carried by rail to eastern seaports.

The Canal will be a boon to the countries of Western Europe, whose products destined for the Pacific States and the Canadian Northwest will no longer bear the burden of a long rail haul from Atlantic ports, but will be distributed by railroads from the Pacific ports.

The Proposed Great Lakes to Ocean Route

This Great Lakes to Ocean improved waterway when completed as proposed by the Great Lakes and Atlantic Canal and Power Company, Limited, would induce the people of other countries to come to this great inland empire as their best market place, where all that one might require, could be purchased direct.

Owing to the greatly reduced freight rates, and the very low rates per H.P. of the unlimited hydro electric power available, a great reduction would be effected in all cost of shipment, and insurance, as regards all the natural products, animal, mineral and vegetable, and also a manufactured and bye-products for which foreign markets are already established or will be.

The Great Lakes and Atlantic Canal and Power Company, Limited—Its Project

The Great Lakes and Atlantic Canal and Power Company, Limited, possesses all necessary data, plans and maps required to begin the actual work of construction of the proposed Great Lakes to Ocean international waterway. They have started to acquire land for terminals and right-of-way, and are now negotiating with the different States which shall be directly benefitted by this great international waterway development for their co-operation, and several eminent contractors are also interested and now working on plans for the purpose of contracting for the work which is to be carried to completion with all possible rapidity.

Providing there is no political interference, the writer knows of no reason for delay in making seaports of Chambly, P.Q., St. Johns, P.Q., Rouses Point, N.Y., Plattsburg, N.Y., Port Henry, N.Y., Crown Point, N.Y., Whitehall, N.Y., Burlington, Vt., and other places along the Richelieu River and Lake Champlain, by the opening of navigation in 1922, and in 1924 for ocean steamers to dock at the ports of Prescott, Toronto, Hamilton and other places along the St. Lawrence River and Lake Ontario, and in 1925 in Lakes Erie, Huron, Michigan and Superior, and also to New York City, via the Hudson River. An examination of the topographical survey of the country through which this waterway will be cut as laid out on the accompanying map, furnishes sufficient evidence of its engineering and economical feasibility. This Great Lakes to ocean waterway as proposed by the Great Lakes and Atlantic Canal and Power Company, Limited, can be accomplished by the building of only fourteen locks between Lake Superior and the Atlantic Ocean, and with-

out having to cross over the Height of Land, but simply by following the natural water flow between Lake Superior and the St. Lawrence River, and without such engineering difficulties as had to be overcome in the building of the Panama, Manchester, Suez, North Sea, (Baltic), and New York State Canals. It would therefore be possible to complete this speedy navigable waterway from the Great Lakes to the Ocean within five years, at a cost not to exceed \$500,000,000. Simultaneously the canal feeders between Port Severn and Lake Ontario, and from Georgian Bay to Montreal via Ottawa, with a development of 10,000,000 hydro-electric horse power, could also be completed at a cost not to exceed \$200,000,000., thus distributing in Canada about \$500,000,000. in wages and supplies in about five years time, and enabling Canada to use hydro-electric power at as low a rate as it may be had by any other place in the world, so that Canada could afford to manufacture commodities to compete in first cost with any other country in the world, and world competing transportation rates.

N. M. CANTIN.

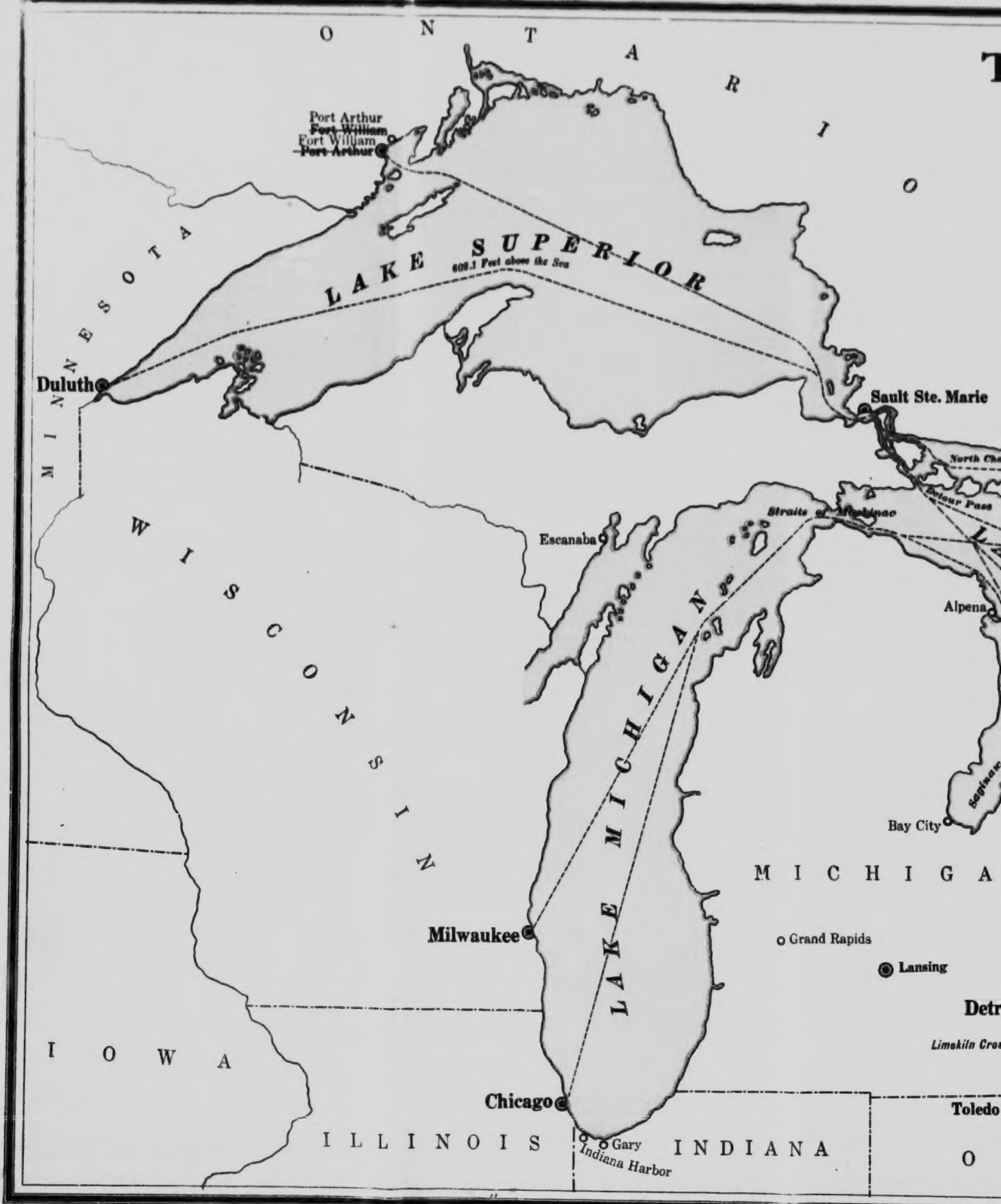
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THE GREAT LAKES AND ATLANTIC CANAL AND POWER COMPANY, LIMITED

GREAT LAKES TO OCEAN ROUTE

REFERENCES

PROPOSED CANALS	
PROPOSED IMPROVED WATER ROUTES	-----
GOVERNMENT CANALS	-----



LAKE AND ATLANTIC CANAL **NAVIGATION COMPANY, LIMITED** **LAKE TO OCEAN ROUTE**

REFERENCES

CANALS	—————
IMPROVED WATER ROUTES ———	-----
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